

2nd International Conference and Exhibition on **Mechanical & Aerospace Engineering** September 08-10, 2014 Hilton Philadelphia Airport, USA

Thermal analysis for a star tracker support in low earth orbit remote sensing spacecraft

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The thermal control system (TCS) is an integral part of spacecraft. Its purpose is to maintain all the components of a spacecraft within their respective temperature limits during SC lifetime. Star Tracker is one of SC external components which is fixed on a bracket and has its own thermal control. Orbital position and attitude of spacecraft, different sources of thermal energy acting on a spacecraft; solar radiation, albedo, earth emitted infrared, and heat generated by onboard equipment are considered. Star tracker support model is created by Proengineer program, and exported to Ansys program in order to launch a parametric study and perform thermal analysis to check design by calculating the temperature field along the support. Calculation of temperature field along star tracker support (maximum and minimum temperature) is performed in order to reach the optimum shape which will meet the thermal requirements and realize the required range of temperature along the support. Temperature range along star tracker support should be between -20°C and 35°C. In the present work, five cases for star tracker support are described in order to reach the optimum support design.

Biography

Ahmed M Farag received a BS in Engineering from Military Technical College, Cairo in 2000. He did MSc from Engineering Faculty; Cairo University in 2007. He is a PhD student in Engineering Faculty, Cairo University since 2012. He is a specialist in air-conditioning systems, and working now as spacecraft thermal control engineering.

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